5G Technology

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Why is in news? Move over VoLTE, it's time for Vo5G: How it works and when is India getting it

Remember when VoLTE (Voice over Long-Term Evolution) first hit the scene in India back in 2016? It was a major step up from the poor call quality we were used to with 3G/2G networks.

But now that 5G has landed in India and seeing as VoLTE is tied to 4G systems, tech enthusiasts are itching for a new calling standard to match the next-gen speedsEnter Vo5G (Voice over 5G), which has already been deployed in several countries globally.

Vo5G:

Voice over 5G, also known as **Voice over New Radio** (VoNR), is probably the future of voice calling.

This standard **allows voice calls over 5G networks** instead of the current standard that uses 4G

In simple terms, Vo5G **takes all the improvements of 5G** – speed, capacity, responsiveness – and applies them squarely to voice.

It is the 5th generation mobile network. It is a **new global wireless standard** after 1G, 2G, 3G, and 4G networks.

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5G Technology is expected to have a 40 % of mobile subscriptions in India by 2027, as it is expected that India will consume 50 G.B. of data per month on average.

The fastest network for transferring the data fast is the later upgrade in the long term evolution of mobile broadband networks.

It **enables a new kind of network** that is designed to connect virtually everyone and everything together including machines, objects, and devices.

Internet speeds in the high-band spectrum of 5G has been tested to be as high as 20 Gbps (gigabits per second), while, in most cases, the maximum internet data speed in 4G has been recorded at 1 Gbps.

5G is used across **three main types of connected services**, including enhanced mobile broadband, mission-critical communications, and the massive IoT.

Evolution from 1G to 5G:

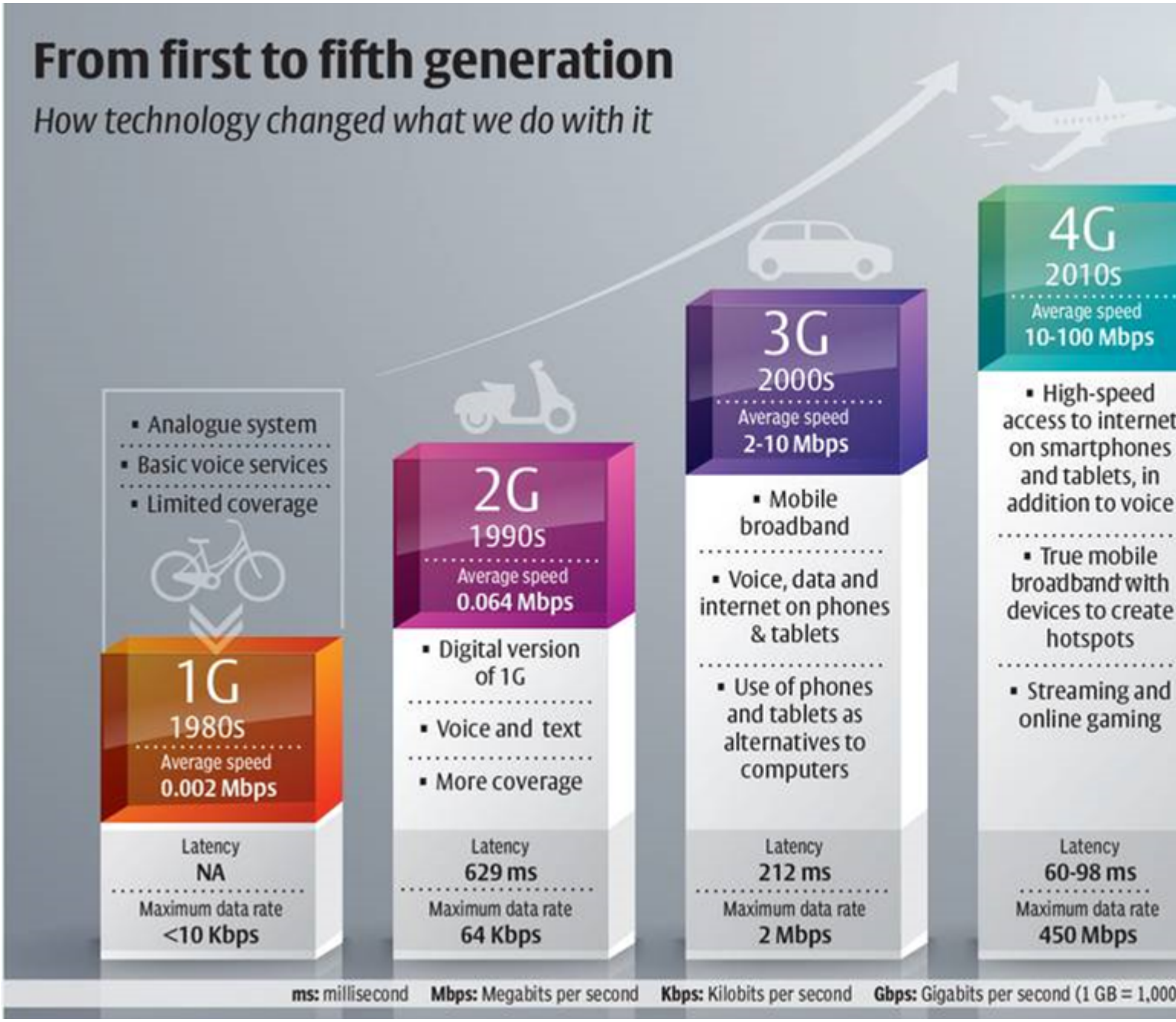
1G: Launched in the 1980s. Analog radio signals and supported only voice calls.

2G: Launched in the 1990s. Uses digital radio signals and supported both voice and data transmission with a Bandwidth (BW) of 64 Kbps.

3G: Launched in the 2000s. With a speed of 1 Mbps to 2 Mbps it has the ability to transmit telephone signal including digitized voice, video calls and conferencing.

4G: With a peak speed of 100 Mbps-1 Gbps it also enables 3D virtual reality.

5G: with a speed of more than 1Gbps, it is capable of connecting entire world without limits.



How is VoNR better than VoLTE?

VoNR brings **clear advances over VoLTE** thanks to the capabilities enabled by 5G networks.

With 5G's substantially **higher bandwidth and lower latency** compared to 4G LTE, VoNR calls benefit in a few key areas.

The **call quality is better** with VoNR. It utilises more advanced audio codecs that provide superior clarity and fidelity based on 5G's increased data capacity.

The **call connection time should be faster** with VoNR thanks to 5G's reduced network latency.

Additionally, the **reliability and continuity of calls should be better** under VoNR. There is lower packet loss, potentially leading to fewer voice cutouts.

Besides this, the shift to VoNR should finally **end the notorious drop issues** users in India often deal with when they call someone.

5G users have continued to complain about delays when they dial up someone and the phone switches from 5G to 4G to use the VoLTE standard.

When VoNR catches on, 4G should go dormant on phones that support 5G (at least when the network doesn't drop to 4G), meaning no delays or drops.

Applications of 5G technology:

5G will revolutionize the mobile experience with **supercharged wireless network**. Compared to conventional mobile transmission technologies, voice and high-speed data can be simultaneously transferred efficiently in 5G.

5G can provide 120 frames per second, **high resolution and higher dynamic range video streaming without interruption**. Audiovisual experience will be rewritten after the implementation of the latest technologies powered by 5G wireless.

IoT applications collects huge amount of data from millions of devices and sensors and thus requires an efficient network for data collection, processing, transmission, control and real-time analytics which 5G network is a better candidate.

5G has added advantages for **machine learning, robotics, and other programming modules**. It can provide faster processing of data.

Due to Covid-19, **Online learning** has gained a lot of momentum. But the speed of the internet set up a big hurdle in **digital education**. 5G Technology can help in faster connectivity and a better learning experience. It'll also open new avenues for learning.

5G Technology will help in the field of **Telemedicine and biotechnology**. It will help in spreading access to medical services to far-fledged areas.

5G Technology can help in **better access and last-mile access to Government services** for the citizens. It will help foster public grievance redress and ensure transparency and accountability in government services.

India can boost its Make in India program and also **compete with China in terms of the 5G Technology rollout**. To **meet the pace of global technology**, India needs to speed up its 5G research.

Benefits of the 5G:

Telecom industry players like Reliance Industries Limited, Bharti Enterprises and Aditya Birla Group committed to **a speedy roll-out of "affordable" 5G services in India**.

Indian mobile phone users will **experience ultra-high Internet speeds** via 5G wireless technology and bring a new digital era in the country.

5G technology will bring **transformation in crucial areas** including agriculture, health, education, Transport, logistics, smart cities, Industry 4.0 and financial inclusion etc.

5G technology will **bolster tech revolution domestically and propel India's position** as an economic and tech powerhouse globally.

It will provide **new opportunities for start-ups** to come up with innovative solutions to solve existing challenges, create jobs and contribute to India's economic resilience. For example, demonstrations of 5G solutions, chipsets, networking equipment etc. development by Indian telecom start-ups, MSMEs and large manufacturers.

According to an estimate, it can lead to employment opportunities for almost 5 crore youth in India.

India was dependent on other countries for 2G, 3G and 4G technologies. However, India has set a global standard in telecom technology for the first time with 5G.

Henceforth, India will **play an active role in the development and implementation** of 5G related technology rather **than being a mere consumer** of technology.

As per the recent Ericsson report, 5G technology might **contribute to 39 % of mobile subscriptions in India by 2027** i.e. about 500 million estimated subscriptions.

5G technology will serve as **a link to several science & technology driven application** useful in daily lives such as-

Connected Ambulance (Emergency healthcare), Fixed Wireless Access (FWA) for Rural Broadband Connectivity, High Security Routers, AI based Cyber Threat Detection Platform, Smart-Agri Programme using IoTs, HD Cameras and Drones, etc.

Issues with 5G Implementation:

Widespread rollout of 5G across India (especially rural areas) will **need strong technological backup and capital adequacy** on behalf of Indian telecommunication companies.

For an efficient 5G coverage, **doubling of fiber connectivity** will be **needed for pan-India networks** as presently FOC connects only 30% of India's telecom towers.

Since India has banned some leading foreign telecom original equipment manufacturers (OEMs), deployment of 5G may face **hurdles with respect to Indian hardware**.

5G **spectrum pricing in India is far costlier than the global average**, raising valid concerns over affordability of services by customers eventually.

Another challenge many are saying is that the 5G Technology spectrum **could add a lot of interference in the aircraft navigation system**.

To date, and after much research performed, **no adverse health effect** has been causally linked with exposure to wireless technologies.

Tissue heating is the main mechanism of interaction between radiofrequency fields and the human body. Radiofrequency exposure levels from current technologies result in negligible temperature rise in the human body.

When is VoNR making its way to India?

Voice over New Radio is **not yet available in India**. This, even as leading carriers continue rolling out 5G across major cities.

There's been **no official announcement** from Reliance Jio, Airtel, Vi, or any other operator about an impending VoNR launch, suggesting widespread availability is still quite far off.

However, as stated above, if you recently bought a shiny new 5G smartphone, chances are high it supports VoNR and is ready to leverage the technology whenever it does go live.

Reports indicate Reliance Jio, India's largest mobile carrier, has **been testing VoNR behind the scenes**.

The goal is to **ensure smooth interoperability between existing 4G VoLTE networks and new 5G infrastructure**.

This should deliver higher voice call quality and lower latency when users switch between 4G and 5G connectivity mid-call.

And since VoNR is primarily designed for 5G standalone networks which Jio does operate on, they are expected to be among the first in India to fully roll out VoNR services.

Competitors like Airtel and Vi will likely follow suit quickly when that happens.

The timeline for VoNR availability remains ambiguous. But regardless of when exactly it rolls out, VoNR represents the natural evolution of voice calling in the 5G era.

Way Forward:

The country needs to **encourage and boost its local 5G hardware manufacturing** at an unprecedented rate if it needs to realise the 5G India dream.

Rationalisation of this spectrum pricing is needed so that the government generates adequate revenue from the auction without hampering implementation plans for 5G in India.

5G can be deployed at different band spectrums and at the low band spectrum, the range is much longer which is helpful for the rural areas.